

The present specification disclosed a hydrogen refinement apparatus comprising a reformed gas feeding part containing at least a hydrogen gas and water vapor, and a reaction chamber equipped with a carbon monoxide shifting catalyst body downstream said reformed gas feeding part, wherein said carbon monoxide shifting catalyst body comprises a carrier supporting Pt, the carrier being composed of at least one metal oxide having a BET specific surface area of $10 \text{ m}^2/\text{g}$ or more, and a method for operating the apparatus. The present invention provides improved heat-resistance of the CO shifting catalyst body, and can operate stably even if the apparatus is activated and stopped repeatedly.